

# TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: 2AWMDA312


Equipment Under Test : RFID Fixed Reader  
Model Name : a312  
Variant Model Name(s) : -  
Applicant : Apulse Technology Co., Ltd.  
Manufacturer : Apulse Technology Co., Ltd.  
Date of Receipt : 2020.01.17  
Date of Test(s) : 2020.09.24 ~ 2021.01.28  
Date of Issue : 2022.09.27

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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We are responsible for all the information of this test report except for the data(※) provided by the customer.

Tested by:

  
\_\_\_\_\_  
Murphy Kim

Technical  
Manager:

  
\_\_\_\_\_  
Jinhyoung Cho

**SGS Korea Co., Ltd. Gunpo Laboratory**



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## 1. General Information

### 1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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### 1.2. Details of Applicant

Applicant : Apulse Technology Co., Ltd  
 Address : C-1211, 60, Haan-ro, Gwangmyeong-si, Gyeonggi-do, South Korea, 14322  
 Contact Person : Jang, Robin  
 Phone No. : +82 10 5526 0605

### 1.3. Details of Manufacturer

Company : Same as applicant  
 Address : Same as applicant

### 1.4. Description of EUT

|                             |   |
|-----------------------------|---|
| <b>Kind of Product</b>      | RFID Fixed Reader                                   |
| <b>Model Name</b>           | a312  |
| <b>Power Supply</b>         | DC 12 V   |
| <b>Frequency Range</b>      | 902.75 MHz ~ 927.25 MHz (RFID)                      |
| <b>Modulation Technique</b> | ASK   |
| <b>Number of Channels</b>   | 50 channels (RFID)                                  |
| <b>Antenna Type</b>         | External antenna                                    |
| <b>Antenna Gain*</b>        | 5.34 dBi  |
| <b>H/W Version</b>          | Main B/D : Version 1.2, RFID Module : Version 2.0   |
| <b>S/W Version</b>          | Main B/D : Version 2.0.4, RFID Module : Version 1.0 |

### 1.5. Test Report Revision

| Revision | Report Number          | Date of Issue | Description  |
|----------|------------------------|---------------|--|
| 0        | F690501-RF-RTL001617   | 2021.01.28    | Initial  |
| 1        | F690501-RF-RTL001617-1 | 2022.09.27    | Added EUT Information of Simultaneous transmission condition |

## 2. RF Exposure Evaluation

### 2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency Range (MHz)                                   | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Average Time     |
|---|-------------------------------|-------------------------------|-------------------------------------|------------------|
| (A) Limits for Occupational/Controlled Exposure         |                               |                               |                                     |                  |
| 0.3-3.0   | 614                           | 1.63                          | *100                                | 6                |
| 3.0-30  | 1842/f                        | 4.89/f                        | *900/f <sup>2</sup>                 | 6                |
| 30-300  | 61.4                          | 0.163                         | 1.0                                 | 6                |
| 300-1 500   | -                             | -                             | f/300                               | 6                |
| 1 500-100 000   | -                             | -                             | 5                                   | 6                |
| (B) Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                  |
| 0.3-1.34  | 614                           | 1.63                          | *100                                | 30               |
| 1.34-30   | 824/f                         | 2.19/f                        | *180/f <sup>2</sup>                 | 30               |
| 30-300  | 27.5                          | 0.073                         | 0.2                                 | 30               |
| <b><u>300-1 500</u></b>                                 | <b>-</b>                      | <b>-</b>                      | <b><u>f/1500</u></b>                | <b><u>30</u></b> |
| 1 500-100 000   | -                             | -                             | 1.0                                 | 30               |

#### 2.1.1. Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where  $P_d$  = power density in  $mW/cm^2$

$P_{out}$  = output power to antenna in  $mW$

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in  $cm$

$P_d$  the limit of MPE,  $1 mW/cm^2$ . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

**2.1.2. Test Result of RF Exposure Evaluation**

Test Item : RF Exposure Evaluation Data  
 Test Mode : Normal Operation

**2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance**

**RFID**

**- Maximum tune up tolerance**

| Frequency Range (MHz) | Output Average Power to Antenna (dB m) | Antenna Gain (dB i) | Power Density at 20 cm (mW/cm <sup>2</sup> ) | Limits (mW/cm <sup>2</sup> ) |
|-----------------------|--|---------------------|--|------------------------------|
| 902 - 928             | 23                                     | 5.34                | 0.135 747                                    | 0.60                         |

**Note;**

- The power density Pd (5th column) at a distance of 20 cm calculated from the friis transmission formula is far below the limit of 1 mW/cm<sup>2</sup>.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dB i and must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.
- According to KDB 447498 D01 RF Exposure Guidance 4.1.
- The RF exposure was evaluated by output average power of tune-up procedure considering tolerance. So, maximum peak conducted power may exceed the power mentioned in this report.
- Simultaneous Condition.  
 The EUT has four antenna ports switch the output of the same power amp to the four ports by applying an RF switch. Switch each port with a time difference without using for ports at the same time. When one port is operating, other ports not transmit at the same time.

**- End of the Test Report -**